

REMARKS

Applicants have carefully studied the outstanding Official Action. The present response is intended to be fully responsive to all points of rejection raised by the Examiner and is believed to place the application in condition for allowance. Favorable reconsideration and allowance of the application is respectfully requested.

Claims 1 – 26 are currently pending in the Application. In the present response, claims 1, 3, 4 and 6 are amended.

Claims 4, 6 – 8, 13, 14, 19 and 23 stand rejected under 35 U.S.C. 102(b) as being anticipated by Stutzman et. al. (U.S. 6,795,028).

Claims 1, 2, 9 – 12, 20 – 22 and 24 – 26 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Stutzman et. al. in view of Sanad (U.S. 6,218,991).

Claim 5 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Stutzman et. al. in view of Luk et. al. (U.S. 6, 593,887).

Claims 3 and 15 – 18 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Tai et. al. (U.S. 6,812,892) in view of Sanad.

Stutzman et. al. describes a low profile PIPA antenna formed from a single piece of conductive material including a first plate, spaced apart from a ground plate. The first and ground plates are interconnected by a shorting plate and a feed plate is interposed between the first and ground plates.

Sanad describes a PIFA antenna including a circuit element, a ground plane and a feed probe. The circuit element has a planar portion with a reactance window and a narrow tab that is connected to the ground plane.

Luk et. al. describes a patch antenna disposed by a dielectric distance above a ground plane.

Applicants express appreciation to Examiner Tan Ho for the courtesy of an interview which was granted to applicants' representative, Sanford T. Colb (Reg. No. 26,856). The interview was held at the USPTO on November 24, 2009. The substance of the interview is set forth in the Interview Summary.

At the interview, claim 1 was discussed vis-à-vis the prior art of Stutzman et. al. (U.S. 6,795,028). The Interview Summary states, in relevant part, “The Examiner agrees that the patent 6,795,028 does not teach the limitation ‘said feed plate feeding ... at a location corresponding to an impedance substantially greater than 50 Ohm at at least one band’ in claim 1.”

As proposed at the interview, applicants have amended claim 1 to include the recitation “said feed plate being substantially smaller than said at least one radiating element.”

As further proposed at the interview, applicants have amended each of claims 3, 4 and 6 to include the recitations “said feed plate feeding said at least one radiating element at a location corresponding to an impedance substantially greater than 50 Ohm at at least one band” and “said feed plate being substantially smaller than said at least one radiating element.”

Stutzman differs from the present invention, as recited in amended claims 1, 4 and 6, in that Stutzman does not teach feeding the radiating element at a location corresponding to impedance substantially greater than 50 Ohms. To the contrary, Stutzman teaches feeding at an impedance of 50 Ohms (col. 4, lines 26 – 27). Feeding at a location corresponding to impedance greater than 50 Ohms is not simply a matter of matching impedances but rather of feeding the radiating element at a high impedance point as opposed to at a low impedance point, as in Stutzman. Feeding the radiating element at a high impedance point is counter-intuitive and would not be expected to be practicable due to back reflection of energy at the feed point. However, it was found to be implementable in the present invention due to bi-directional coupling which occurs at the feed point, whereby the feed point capacitively couples with the radiating plate above it and the ground plate beneath.

Furthermore, in Stutzman the feed plate and top radiating plate are of similar sizes, with the feed plate being 80% - 90% of the length of the top plate (col. 5, lines 60 – 61). This is in contrast to the present invention, as recited in amended claims 1, 4 and 6, in which the feed plate is substantially smaller than the radiating element. This structural difference between Stutzman and the present invention arises due to the difference between Stutzman and the present invention outlined above, namely that in the present invention feeding is carried out at a high rather than low impedance point.

This allows the feed plate of the present invention to be much smaller than the radiating element. In Stutzman, the feed plate and radiating element must be similarly sized so as to have slightly different resonances and thus create the broader bandwidth of Stutzman's antenna.

In addition, it can be clearly seen from Fig. 7 of Stutzman that Stutzman's feed plate partially overlaps a portion of the radiating element but does not overlap the galvanic connector. This differs from the present invention, as recited in amended claim 4, in which the feed plate partially overlaps portions of two conductive arms defined by the radiating element and the galvanic connector.

Tai et. al. describes a dual band antenna including a planar conductive element including first and second radiating strips, a ground portion and a connecting strip connecting the first and second radiating strips to the ground portion, and a feeder cable electrically connected to the conductive element.

Tai does not show or suggest feeding the radiating strips at a location corresponding to an impedance substantially greater than 50 Ohms, as recited in amended claim 3, which feeding location is unique to the present invention and counter-intuitive as described above.

Furthermore, applicants respectfully disagree with the Examiner's interpretation of element 42 of Tai as a feed plate. Element 42 is part of a connector between Tai's radiating elements and the ground plane (col. 2, lines 53 – 54). The presence of this connector is essential to the functioning of Tai's invention as a PIFA antenna. Tai therefore does not teach the feed plate of the present invention, as recited in amended claim 3.

As discussed above, applicants have amended each of claims 3, 4 and 6 to include the recitation 'said feed plate feeding said at least one radiating element at a location corresponding to an impedance substantially greater than 50 Ohm at at least one band' to more clearly recite that in the present invention the feed plate feeds the radiating element at a high impedance rather than low impedance point which, as discussed above, is not shown by any of the prior art of record.

As discussed above, applicants have additionally amended each of claims 1, 3, 4 and 6 to include the recitation 'said feed plate being substantially smaller than

said at least one radiating element' which, as discussed above, is not shown by any of the prior art of record.

Support for the amendment to claim 1 is found in Figs. 2A – 2D of the Application as published. Support for the amendments to claim 3 is found in Figs. 3A – 3D and paragraphs [0024] and [0034] of the Application as published. Support for the amendments to claim 4 is found in Figs. 4A – 4D and paragraphs [0024] and [0040] of the Application as published. Support for the amendments to claim 6 is found in Figs. 5A – 5D and paragraphs [0024] and [0047] of the Application as published.

Applicants respectfully submit that the antenna as recited in amended claims 1, 3, 4, and 6 respectively, including, inter alia, a feed plate feeding at least one radiating element at a location corresponding to an impedance substantially greater than 50 Ohm at at least one band, the feed plate being substantially smaller than the at least one radiating element, is not shown or suggested by prior art, either alone or in combination, and that amended claims 1, 3, 4 and 6 are therefore patentable.

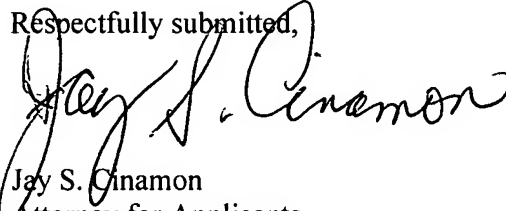
Claims 2 and 9 - 12 each depend directly from claim 1 and recite additional patentable subject matter and therefore are allowable. Claims 8 and 15 - 18 each depend directly from claim 3 and recite additional patentable subject matter and therefore are allowable. Claims 5, 13 and 19 - 22 each depend directly from claim 4 and recite additional patentable subject matter and therefore are allowable. Claims 7, 14 and 23 – 26 each depend directly from claim 6 and recite additional patentable subject matter and therefore are allowable.

Applicants have carefully studied the remaining prior art of record herein and conclude that the invention as described and claimed in the present application is neither shown in nor suggested by the cited art.

In view of the foregoing remarks, all of the claims are believed to be in condition for allowance. Favorable reconsideration and allowance of the application is respectfully requested.

Please charge any fees which may be due to our Deposit Account no. 01-0035.

Respectfully submitted,



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